ATTACHMENT A
Remarks

Claims 1-17 stand pending in the present application. By this Amendment, Applicants have amended claims 1, 14 and 15 and added new claims 16 and 17. Applicants respectfully submit that the present application is in condition for allowance based on the discussion which follows.

Claims 14 and 15 were rejected under 35 U.S.C. § 112, second paragraph. Specifically, claim 14 was rejected for including the phrase "e.g." and claim 15 was rejected for including the term "mean valve". By this Amendment, Applicants have amended claim 14 by deleting the phrase "e.g." and added new claim 16 directed to the previously recited range. Further, claim 15 has been amended by replacing the term "mean valve" with the phrase "an average of the two measured pressures". Applicants respectfully submit that these claim amendments obviate the 35 U.S.C. § 112, second paragraph, rejection to these claims.

Claim 1 was rejected under 35 U.S.C. § 102(e) as being anticipated by Al-Ali et al (hereinafter "Al-Ali"), claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Al-Ali in view of Gasner and claim 13 was rejected under 35 U.S.C. § 103(a) as being obvious in view of Al-Ali.

With regard to claim 1, the Examiner alleges that Al-Ali discloses "a loudspeaker system having sensor means 50 (microphone) for determining the radiation resistance (acoustic pressure) of the loudspeaker diaphragm".

Contrary to the Examiner's assertion, the loudspeaker system of Al-Ali fails to teach or suggest a sensor for determining the radiation resistance based on the measurement of acoustic pressure in front of the diaphragm. Al-Ali teaches a system in

which a sound (i.e., acoustic) pressure or frequency response of a loudspeaker immediately in front of the loudspeaker diaphragm is controlled by a closed loop feedback system such that a relatively flat frequency response is obtained, e.g., as provided in Al-Ali Figure 19A. Although Al-Ali teaches a system which uses a microphone for measuring the acoustic pressure in front of a diaphragm, merely knowing the acoustic pressure does not provide one with the radiation resistance.

Contrary to the teaching of Al-Ali, the present invention is directed to a loudspeaker system which includes a sensor which determines the radiation resistance of a diaphragm. The radiation resistance is expressed by the velocity/acceleration of the loudspeaker diaphragm and the sound pressure at a distance from the diaphragm. Accordingly, in order to determine the radiation resistance, the present sensor includes a microphone which detects the sound, i.e., acoustic, pressure in at least two points differently spaced from the diaphragm which permits the sensor to express the radiation resistance in terms of velocity/acceleration of the diaphragm and sound pressure at a distance from the diaphragm.

The present invention provides for features and advantages not taught in the art let alone Al-Ali, namely determining radiation resistance of a loudspeaker diaphragm. Specifically, e.g., using the sound pressure at two points with one point close to the diaphragm and the other one spaced further from the diaphragm, the acceleration of the diaphragm can be estimated using the claimed sensor. Further, the present sensor permits one to determine the radiation resistance which is proportional to the ratio between the second sound pressure and the first sound pressure. (See present specification, page 3, lines 8-20.) Knowing the radiation resistance allows one to

indirectly determine the radiating sound power. Compensating for changes in radiation resistance enables one to counteract undesired changes of the radiated sound power in the listening room. For example, if the loudspeaker is moved from an initial position in a room far away from any of the boundaries of the room, the loudspeaker diaphragm will experience a certain radiation resistance depending on its dimensions and the frequency of the sound radiated. If the loudspeaker is moved to a corner portion of the room, the radiation resistance will increase by a factor of up to eight times at low frequencies due to the sound energy being radiated over a limited solid angle compared to the omni-directional radiation in the initial position. Thus, the present system can determine changes of radiation resistance and compensate for these whereby the power radiated to the room will be kept constant regardless of the actual position of the loudspeaker in the room. In order to carry out this compensation appropriately, radiation resistance or alternatively the radiated sound power itself must be determined.

If, contrary to the present system which uses radiation resistance, one were to use a feedback system which uses measured sound pressure in the near field of the loudspeaker diaphragm, as in the Al-Ali patent, changes in the location of the loudspeaker in the room as described above will not result in corresponding changes of the acoustic pressure immediately in front of the loudspeaker diaphragm. Only, quite small changes of acoustic pressure will result. This is due to the fact that in the near field of the loudspeaker diaphragm, the acoustic pressure generated by the vibrating diaphragm will be determined not by radiation resistance experienced by the diaphragm but by the mass of the air in front of the diaphragm forced to vibrate with the diaphragm. The mass of air will not be changed by changing the position of the loudspeaker relative

to the room and hence only small variations of acoustic pressure will result in the near field of the diaphragm. The exact relationship between these changes and the changes of radiation resistance will furthermore not be generally known.

In summary, the acoustic effect of the system according to Al-Ali, and according to the present invention are quite different, and the Al-Ali patent is absolutely silent about determining radiation resistance as a control parameter. The same applies furthermore to Gasner where the determination of acoustic pressure disclosed herein serves a quite different purpose and takes place inside the enclosure of the loudspeaker system.

Based on the foregoing, Applicants respectfully submit that claim 1 is not anticipated by Al-Ali as Al-Ali fails to teach or suggest determining sound pressure at two positions from a diaphragm and therefore fails to teach or suggest the present system with a sensor which determines radiation resistance based on sound pressure at those two points. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection to claim 1 as being anticipated by Al-Ali.

By this Amendment, Applicants have added new claim 17 corresponding to claim 1 which further defines the radiation resistance as being based on the sound pressure at two points spaced from the diaphragm, and therefore, Applicants respectfully submit that claim 17 is also not anticipated by Al-Ali for at least the same reasons as claim 1 and further differentiated by reciting the exact means by which radiation resistance is based.

With regard to the rejection of claim 7 under 35 U.S.C. § 103, Applicants respectfully submit that Gasner uses measurement of acoustic pressure at several

points within the loudspeaker enclosure for a completely different purpose than the present invention, namely to provide signals for the active drivers of the cavity pressure control device (D1) used to counteract pressure variations in the enclosure caused by the movement of the main driver (sound transducer T1). Moreover, the Gasner system has nothing to do with either determining or using radiation resistance for the control of sound power delivered to a listening room. Thus, for the reasons argued above with regard to the rejection of claim 1 as being anticipated by Al-Ali, claim 7 is not made obvious by Al-Ali individually or in combination with Gasner as the prior art individually or in combination with one another fail to teach or suggest the present system for determining radiation resistance using two points differently spaced from a diaphragm of a loudspeaker.

With regard to claim 13, contrary to the Examiner's allegation, Al-Ali fails to teach or suggest a sensor for determining radiation resistance of a diaphragm expressed as the velocity/acceleration of the diaphragm and the sound pressure at a distance from the diaphragm where the sensor includes a microphone which can be positioned at two different locations which permits radiation resistance to be determined. Thus, Applicants respectfully request that the Examiner withdraw the rejection to claim 13 under 35 U.S.C. § 103(a).

Applicants gratefully appreciate the Examiner's indication of allowable subject matter of claims 4-6 and 8-11. By this Amendment, Applicants respectfully submit that all claims are now in condition for allowance.

END REMARKS